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Mr. John Carrigan, Section Chief
Department of Environmental Protection
Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887

June 25, 2007

Re: Amended Corrective Action Design (CAD)
Crow Lane Landfill, Newburyport, MA

Dear Mr. Carrigan:

On behalf of our client, New Ventures Associates, LLC, we are pleased to submit revised drawings and calculations that constitute an amendment to the Corrective Action Design (CAD) previously submitted to the Department for the closure of the Crow Lane Landfill. On May 30, 2007 SITEC Environmental, Inc. submitted revised drawings and design analyses associated with design changes to the proposed perimeter MSE berm. Those documents were submitted in response to a Notice of Technical Deficiency issued by the Department on March 7, 2007. This letter and the enclosed documents are intended to supplement that submission and provide detailed descriptions of changes to the stormwater management and landfill gas collection systems that have been made as a result of the changes in berm design. This submission also includes an early installation component for three (3) additional gas extraction wells along with header piping to increase the area included in the gas collection and treatment system.

The following documents are included with this submittal:

- **Revised Post-Closure Stormwater Calculations & Drainage Area Plan** — Revised: June 25, 2007
  SITEC Environmental, Inc.

- **Revised Site Plans and Details:** — SITEC Environmental, Inc.
  Dwg. No. 3, Final Grading and Stormwater Management; Revised May 9, 2007
  Dwg. No. 4, Landfill Gas Management Plan; Revised June 21, 2007
  Dwg. No. 8, Landfill Gas Management System Details; Revised June 21, 2007

The design changes made to the stormwater management and landfill gas collection systems are described in the following sections of this report and are presented on the drawings referenced above:

1.0 Stormwater Management System Modifications:

Several design modifications have been made to drainage systems along the southerly side of the landfill in response to the recommendations made for MSE type berm construction by the geotechnical consultants and also to reduce the need for existing landfill surface disruption, to the fullest extent possible, during this period of final landfill surface grading and closure construction.

1.1 Southerly Berm Drainage System:

The original CAD prepared by GZA GeoEnvironmental, Inc. included the installation of catch basins, manholes and drainage piping within the full length of the southerly berm. The purpose of the drainage system was to convey runoff from the westerly slope of the landfill all the way back to Basin No. 1 located at the east side of the landfill for treatment prior to discharge. The discharge from Basin 1 would then flow within a culvert, to be installed adjacent to Crow Lane, back to the wetland at the southwest corner of the landfill. This design was requested by the Newburyport Conservation Commission and was carried forward by SITEC within the previous Amended CAD submittal.

The construction of this drainage system within the southerly perimeter berm is no longer feasible due to the recommendation of Geocomp Corp. for MSE berm construction techniques throughout the entire length of the berm. The MSE berm will include the installation of structural geogrid materials at specified horizontal lengths and at 18-inch vertical intervals. The geogrid will provide structural reinforcement to the asphalt grindings that are proposed for use in constructing the berm. The installation of the drainage structures and the construction of the pipeline originally proposed within the berm would interfere with the reinforcing grid system that has been designed thereby compromising the structural integrity of the berm.

As an alternative to these drainage structures and piping, stormwater diversion berms have been proposed and are shown on the revised drawings. The diversion berms will be constructed on the westerly slope of the landfill in order to capture the runoff and convey it to the drainage channel to be formed along the inside edge of the southerly berm. This channel, and the top of the berm, will be constructed to slope in an easterly direction and will ultimately discharge to Basin 1 at the southeast corner of the landfill. Similarly, the diversion berms will also direct westerly slope runoff to Basin 2 along the drainage channel to be formed along top the northerly berm. Approximately 95% of the westerly slope runoff will be collected and conveyed to either Basin 1 or Basin 2. The

delineation of the drainage areas to each basin is presented on Post Closure Drainage Area Plan included herein. The remaining 5% of stormwater runoff from the lower slope area (beneath the diversion berms) and a portion of the final perimeter berm surface will be collected within a single drainage structure to be installed at the southwest corner of the landfill where it will be discharged to a stone channel that ultimately drains to the westerly wetland.

This alternate design will ensure that the integrity of the southerly berm is not compromised and will provide long-term stormwater runoff control and treatment. This design also facilitates post-closure maintenance requirements and resolves concerns previously expressed by the Department regarding the integrity of the seal associated with the membrane capping system and these stormwater structures. Revised drainage calculations have been prepared in order to confirm the performance and capacity of the 2 detention basins and the site wide drainage system. A summary table is included with the drainage calculations the shows that the system will provide for adequate control and treatment of stormwater runoff for all of the major rainfall events including the 100 year storm. A slight increase in peak flow rate is noted (less than 0.25 cfs) for the 10 year-24 hour rainfall event ,however, it is the opinion of SITEC that this will not cause detrimental impact downstream of the landfill. Peak flows are attenuated for the 25 through 100 year storms.

1.2 Detention Basin 1 Discharge:

It is the intent and desire of New Ventures to minimize landfill surface disruption and potential odor sources during the construction of the perimeter berm structure and the installation of the final capping system. This will facilitate construction and prevent unnecessary odor episode potential. To accomplish this, New Ventures had another topographic survey performed on the remaining uncapped landfill surface so that we could re-examine the berm and cap design and make any adjustments that may be needed to ensure that berm and stormwater management system fit with minimal excavation and/or disruption to the surface.

In reviewing the as-built survey and design plans, it was observed that the previous revisions made by SITEC to the discharge system from Basin 1 would require the proposed limit of waste (back edge of berm) to be pushed further back into the landfill. This prior proposal would have required excessive waste excavation and relocation along a large segment of the slope on the southerly side. The revision that caused this situation was the replacement of the originally proposed closed culvert system with an open stone lined drainage channel along the New Ventures property line adjacent to Crow Lane requested by the Newburyport Conservation Commission.

To address the recent changes, we are now proposing that the closed culvert discharge from Basin 1 be re-instituted so that the southerly perimeter berm can be moved to its

original location and the need for slope adjustment and waste excavation can be eliminated. This culvert system will not require significant post-closure maintenance because only treated stormwater will be flowing through the system and because manhole structures have been added at frequent intervals so that periodic inspection and maintenance cleaning can be performed. The enclosed drawings reflect this design revision.

1.3 Detention Basin 2:

Additional topographic as-built survey was conducted within Basin No. 2 during its construction so that accurate contour lines within the basin could be generated. Also, during basin construction a determination was made that it would be advantageous to move the primary outlet discharge structure further to the north within the basin. Moving the structure allowed New Ventures to take advantage of a natural depression just outside the basin and minimized the need for tree removal. The enclosed drawings reflect these conditions in Basin No. 2. In addition, the revised post-closure stormwater calculations have been adjusted taking the as-built configuration of the basin into consideration. It is noted that under the as-built conditions additional storage is provided within Basin 2 for the attenuation and treatment of stormwater from the landfill.

2.0 Landfill Gas Management System Modifications:

Presently, final cover materials have been installed on approximately sixty (60) percent of the Landfill. These materials include a geocomposite gas collection layer and an HDPE geomembrane cap. Final cover soil placement above the cap has not been initiated at this time. Prior to cap installation in these areas (which are referred to as Phase I and II) two separate systems were installed for landfill gas collection. These systems included a series of vertical wells that were drilled into the landfill and a horizontal collection system that included the excavation of trenches and the installation of piping within the landfill surface that was intended to collect gas from the geocomposite gas vent layer installed beneath the membrane cap. These installations were performed based on approved design plans prepared by Cornerstone Environmental Group and SITEC. The horizontal gas collection system has not been activated because the Department has required a higher gas flow rate than it was designed for and gas collection is being performed utilizing the vertical well field only. The approved design plans also include provisions for the extension of these systems throughout the remaining uncapped portions of the landfill. The remaining uncapped areas are referred to Areas IA, IIA and III.

2.1 Area IA Gas System Installation:

Design revisions are presented on the enclosed drawings for the installation of gas system components within the remaining areas. These revisions include the re-alignment of permanent gas collection piping and a substantial reduction to the horizontal collection trench installation concept for gas collection. The locations

originally proposed for the vertical wells are essentially unchanged, however the revised piping plan should allow for accelerated installations of some wells and connection to the extraction, treatment and flare systems.

Portions of the uncapped Area IA on the southwesterly side of the Landfill are currently at or near final subgrade elevations. It appears feasible to install three (3) of the remaining six (6) vertical gas extraction wells on an accelerated basis for the purpose of mitigating potential gas release from this area following the Department's approval of the CAD drawings. These wells are identified on the plans as EW-7, EW-10 and EW-13. These wells can be connected to the existing gas management system by extending a new 6" HDPE gas header along the inside edge of the existing landfill haul road. Minimal excavation is required for this installation. This new header will be connected to the existing system at the location of the old flare, where the header is exposed, and at the top of the landfill where the header was terminated during Phase II system installation. This new 6" header will complete the loop around the landfill and should increase gas collection capabilities, particularly at the south and southwest sides of the landfill. The wells will be connected to the new header with 4" HDPE lateral piping and fittings. This segment of header pipe and the laterals intended to accelerate well activation are shown on Drawing 4 with dashed-bold lines.

2.2 EW-1 Vacuum Restoration:

The Department has suggested that existing gas collection well EW-1 is not functioning efficiently. Low vacuum readings have been recorded on the header side of the well for a period of time. The cause for this vacuum loss has not been determined by SITEC Environmental. In the event that there is damage within the lateral pipe connecting the well to the header, a 6" header pipe will be installed from the new 6" header up the slope to the vicinity of EW-1 to increase vacuum pressure. A new 4" lateral pipe will then be installed from the 6" header to service EW-1. The existing wellhead assembly presently on EW-1 will be repositioned and connected to the new lateral pipe. The existing 4" riser on the old lateral will be capped and left in-place.

2.3 Area IIA and Area III Gas System Installations:

The 6" header pipe extended up the slope for the well EW-1 tie-in will also be fitted with a separate blind flange installed at the end. This flange will be installed for the future expansion of the gas management system with Areas IIA and III when the landfill surface has reached final grade and elevation. Extraction wells EW-14, EW-15 and EW-16 will be installed and activated at that later time. The piping configuration for the connection of the final three wells is presented on the enclosed plan and is shown with solid-bold lines.

2.4 Composite Gas Collection Layer:

For the remaining portions of the uncapped Landfill a modified system for the collection of gas from the composite layer has been designed as potential back-up for the vertical well system. This modified system involves the installation of horizontal gas collection trench segments in select areas adjacent to the vertical gas collection wells rather than throughout the entire landfill surface as shown on the previous Cornerstone plan. The trenches will then be connected to the lateral piping adjacent to each of the wells and will be regulated by separate 2" gate valves. The intent of these limited gas collection trenches is to provide the ability for the removal of landfill gas from within the composite layer should it be determined that a build-up of gas is occurring. The locations of the proposed horizontal gas collection trenches are presented on Drawing 4, *Landfill Gas Management Plan*.

We hope that the information presented herein, in conjunction with the previous revised perimeter berm design submittal, is sufficient for the Department to issue an approval of an Amended CAD for the final closure of the landfill as soon as possible. Should you have questions or comments please contact this office. Thank you for your consideration in this matter.

Very truly yours,
SITEC Environmental, Inc.

Michael Quatromoni
Project Manager

Cc:
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